

A NEW SPECIES OF *AÈDES* (*FINLAYA*) FROM NORTHERN AUSTRALIA  
(DIPTERA, CULICIDAE).

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(One Text-figure.)

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*Synopsis.*

Both sexes, larva and pupa of *Aëdes* (*Finlaya*) *britteni*, n. sp., are described from northern Western Australia. It occurs also in Northern Territory. The affinities of *A. britteni* are discussed and it is placed in a new subgroup of Group D of the subgenus *Finlaya*.

For many years only two species of the subgenus *Finlaya*, *Aëdes notoscriptus* (Skuse) and *Aëdes purpureus* (Theobald), were known from northern Western Australia. Hodgkin and Britten (1955) recorded a third, undescribed, species which is here described as *Aëdes britteni*, n. sp. It has since been found also in Northern Territory by Mr. A. K. O'Gower, to whom we are indebted for the opportunity to study his specimens.

*AÈDES* (*FINLAYA*) *BRITTENI*, n. sp.

*Distinctive Characters.*

Adult: This is the only Australian *Finlaya* with hind tarsal segment V white with a narrow basal dark band; other distinguishing characters are dark-scaled proboscis and wings; absence of scutal pattern; scutellar scales all broad, white; small patches of broad white scales on pleuron, including paratergite; hind tarsal segment IV all dark.

Larva: Antenna long, swollen near base; head setae 5 and 6 single or bifurcate, 14 short, stout, single; lateral comb a single row of fringed scales; distal margin of saddle without spines.

*Description of Adult.*

*Female*.—Wing length 3·8 mm. *Head*: Integument orange-brown, clothed mesially with rather sparse narrow-curved creamy scales, in front of which is a continuous band of narrow-curved black scales, terminating laterally in a small patch of flat black scales, below which are flat creamy scales. There is a wide ocular border of flat silvery-white scales, discontinuous at vertex, but a few narrow silvery scales extend between the eyes. Upright forked scales long, black, numerous. A pair of strong black vertical bristles with two pairs of smaller bristles above them and a row of five strong mesially-directed ocular bristles, with finer bristles laterally. Torus dark brown with some small dark setae mesially; flagellar segments of antenna black with short silvery clothing hairs and sparse black verticillate hairs; first flagellar segment paler on basal half and with flat black scales mesially. Clypeus dark brown. Palps and proboscis black scaled; palp 0·2 length of proboscis, which is 1·2 length of fore femur. Labella dark brown.

*Thorax*: Integument bright orange-brown darkened beneath the silver scale patches. Scutum clothed with rather sparse fine narrow-curved dark brown scales. Bristles strong, black, about 13–16 acrostichal, 12–14 dorsocentral, 9–10 prescutellar, a group above wing roots, scattered bristles along lateral margin of scutum, and one on fossa. Scutellum darker brown, all lobes densely clothed with broad flat silvery-white scales; 4–6 long black bristles to each lobe in addition to shorter bristles.

There is a patch of broad silvery-white scales on *apn*, propleuron and paratergite, a small patch on posterior margin of *ppn* below the bristles, on upper *stp*, on lower posterior margin of *stp*, and on upper *msp*. Bristles black; *apn* with 3-4 very strong bristles above, numerous others below; 5 long and 1-2 shorter propleural; 4-5 strong *ppn*; 3-4 postspiracular, one upper *stp* and 2-3 long bristles along posterior margin of *stp* in addition to finer bristles; 8-9 prealar; 8-10 lighter brown upper and no lower *msp* bristles.

*Legs*: Black scaled with purplish-blue reflections and banded tarsi. Coxae and trochanters yellowish-brown; fore coxa with mixed dark and pale scales, mid and hind with patches of silvery scales, hind also with some dark scales below; trochanters dark scaled, mid and hind with pale scales posteriorly. Fore femur with pale scales dorsally on basal 1/4, and extending as a tapering streak posteriorly for 2/3-3/4 length and with a small silvery-white kneespot; tibia dark except for a few white scales dorsally at base; tarsal segments I and II with basal white bands covering 1/5-1/4 I and 1/3 II, I also with a small white apical dorsal patch, and one or two white scales at apex of II and a few scales or small patch at base of III. Mid-femur with creamy scales showing anteriorly as a small basal patch, extending on basal 1/4-1/3 dorsally and as a tapering stripe on basal 1/2-3/5 posteriorly, and with white kneespot; tibia as on fore leg; tarsal segments I and II with basal white bands covering 1/5-1/4 I, 1/3 II, basal patch 1/5-1/3 III, and a few pale scales also at apex of I, II and V. Hind femur with white kneespot and with small dorsal basal patch of creamy scales which has a few pale scales below it anteriorly, and extends as a tapering streak on basal 1/3 posteriorly. Tibia entirely dark or with a few white scales at base; tarsal segments I-III with basal white bands covering 1/5 I, 1/4-1/3 II and 1/3 III, I and II also with small patches of white scales apically, IV all dark, V with basal 1/5 dark, and a ventral line of darkish scales, remainder white. Claws equal, those of fore and mid legs toothed, hind simple.

*Wings*: Black scaled, outstanding scales all long and narrow. Cell R2 1.5-1.6 times length of its stem; cell M1 0.8 times length of its stem, its base slightly proximal to that of cell R2; r-m twice its own length distal to base of M3+4. Halteres pale with dark scales on knob and a few dark and pale scales on upper side of stem.

*Abdomen*: Mainly black scaled with purplish-blue reflections; numerous black bristles along apical and lateral margins of tergites II-VIII and scattered over tergite I and the sternites. Tergite I dark scaled mesially, with silvery-white scaled lateral margin; tergite II with a pair of submedian basal patches of pale-reflecting scales, contiguous with large lateral basal patches of silvery-white scales; III-VI with a broad basal patch of pale scales, covering 1/2-2/3 length of tergite, indented in mid-line on III-V, and with small patches of silvery-white scales slightly removed from basal and lateral margins; VII dark with large lateral white patches, VIII short, dark scaled. Sternites dark scaled, VIII large, exerted, integument dark basally, yellowish-brown apically, clothed with fine hairs and bristles, bare of scales. Cerci short, dark.

Described from the holotype and one paratype female. The holotype has the scutum and scutellum slightly rubbed.

Four females from Roper River Mission show the following differences from the foregoing description: Wing length 3.6-4.7 mm. Some small dark scales mesially on torus (possibly obscured by shrinkage in holotype and paratype); 18-25 acrostichal, 11-13 prescutellar bristles; 7-8 long bristles on lateral lobe of scutellum; 2-4 *ppn*, 1-5 postspiracular, 1-2 upper *stp* and 7-16 prealar bristles. Fore leg: Basal band 1/4-1/3 tarsal segment II; there may be no pale scales at apex of I and II or base of III. Mid leg: Pale scaling at base of femur may be reduced dorsally; basal band 1/4-1/3 tarsal segment II; there may be no pale scales at apex of I, II and V. Hind leg: Posterior stripe may extend to mid length of femur; basal white bands 1/5-1/4 tarsal segment II, 1/4 III; basal 1/4 V dark; no pale scales at apex of I and II. Wings: Cell R2 1.4-2.0 times length of its stem; cell M1 0.7-1.0 times length of its stem, their bases may be level; r-m 2-3 times its own length distal to base of M3+4. Abdomen: Median patches of abdominal tergites may be indented on III-VI or lack indentation on IV-VI.



*Male*.—Resembles the female except as follows: Wing length 2.9–3.2 mm. *Head*: White scales between the eyes may be broad; lateral patch of flat black scales may be absent. Torus large, dark, with fine short setae on mesial aspect; flagellar segments of antenna brown with dense dark verticillate hairs lying mainly in an almost vertical plane, first segment with some flat dark scales distally; two apical segments elongate, dark, with silvery clothing hairs. Palps about equal in length to proboscis, dark scaled with a small white basal band on segment III, sometimes also on II, and wide white basal bands covering  $1/5$ – $1/4$  IV and  $1/2$  V; segments IV and V down turned, without dense hairs but with short dark bristles, about 6 at apex of III, 6 or 7 at apex of IV and 4–6 at tip of V, as well as 12–18 along lower side of IV and numerous finer bristles along V.

*Thorax*: 10–13 acrostichal, 9–16 dorsocentral, 4–9 prescutellar bristles. On mid lobe of scutellum the white scales may be divided into two patches by a narrow median unscaled line; *apn* with 2–3 strong bristles above; 5–7 upper *msp* bristles.

*Legs*: Mid coxa may have a few dark scales below; hind coxa may have white scales only; fore trochanter may be pale scaled posteriorly. Fore leg: The pale posterior streak on femur may extend almost to apex; tibia may be dark basally; basal bands covering  $1/5$ – $1/3$  tarsal segment I,  $1/4$ – $2/5$  II. Mid leg: Femur with a streak on basal  $1/3$ – $2/3$  posteriorly; tibia may be dark basally; basal bands covering  $1/5$ – $1/3$  tarsal segment I,  $1/4$ – $1/2$  II, III sometimes and V usually all dark. Hind leg: Femur may have a complete ring of pale scales at base, or be dark to base anteriorly with streak on basal  $1/4$ – $1/3$  posteriorly; basal white bands covering  $1/5$ – $1/4$  tarsal segment I,  $1/5$ – $1/3$  III. On fore and mid legs, tarsal segment IV is  $1/2$  length of V; claws (Fig. 1, *a*, *b*) large, unequal, pilose basally, the anterior long with a strong blunt tooth near mid length and usually with a slender pointed tooth arising laterally at base (the strong tooth reduced on one mid claw in one specimen), posterior claw shorter, with pointed subbasal tooth. Hind claws equal, simple.

*Wings*: Cell R2 1.2–1.5 times length of its stem, cell M1 0.6–0.8 times length of its stem. Halteres with dark scales on knob and running down dorsal side of stem, sometimes with a few pale scales on knob and stem.

*Abdomen*: Tergite II may have a pair of small submedian basal patches of pale-reflecting scales, III–VI with median basal pale patches  $1/4$ – $3/4$  length of III and IV,  $1/3$ – $3/4$  length of V and VI, indented in mid-line on III and frequently also on IV–VI; VII dark mesially or with median basal pale patch  $1/3$  its length; true tergite VIII dark scaled or with a few silvery scales laterally. Sternites dark scaled, III–VII may have silvery lateral patches at mid length, VII may also have a median basal patch; VIII with large median basal patch of silvery scales.

♂ *Terminalia* (Fig. 1, *c*): Coxite densely clothed with setae and with large patches of silvery scales laterally at base and dark scales towards apex; cylindrical, about four times as long as broad at base, with a membranous area along its inner aspect. The slightly developed basal lobe bears a dense patch of about 60 medium length setae, those in the outer row appearing somewhat stouter; extending distally from this patch, along the tergal side of the membranous area are about six rows of short fine setae, which become longer near apex of coxite. Extending along the sternal side of the membranous area on distal half of coxite are three rows of medium length fine straight setae; sternal to these again, running the length of the coxite and likewise directed mesially are 3–4 rows of longer stouter finely striated setae, the more distal of which are the longest. There are numerous scattered long setae on the sternal, lateral and outer tergal aspects of coxite, densest towards apex; there are also a few shorter setae sternally at base. Style  $2/5$  length of coxite, strongly curved, slightly tapering, non-pilose, with 1–2 short preapical setae; terminal appendage  $1/7$ – $1/6$  length of style, stout, apparently grooved with rounded tip. Harpago about  $1/3$  length of coxite, stout basally, more slender on apical half, pilose except near apex, with a row of 7–9 slender setae mesially on basal half; just beyond these tergally arise two longer setae, reaching to apex of harpago; appendage about  $4/5$  length of harpago, broadening on basal third, then tapering to a slender pointed tip, fairly evenly sclerotized except for membranous broadening near base. Paraproct with single tooth. Phallosome simple,

elongate, tapering distally. Lobes of IXth tergite with 6–10 stout setae; IXth sternite with 15–16 short setae.

*Larva* (Fig. 1, *d-k*).—Nomenclature of setae as in Belkin (1950). Length about 8–10 mm. Cuticle dark. Setae in general rather short.



Fig. 1.—*Aedes brittteni*, n. sp. *a-c*. Male: *a*. Anterior and *b*. posterior claw of foreleg. *c*. Terminalia (tergal view; blade of left harpago omitted).

*d-k*. Larva: *d*. Head. *e*. Prothoracic setae 1-3. *f*. Base of mesopleural and *g*. base of metapleural setae (ventral view). *h*. Terminal segments. *i*. Lateral comb tooth. *j* and *k*. Pecten teeth, *j* from apex and *k* from middle of pecten.

*l-m*. Pupa: *l*. Cephalothorax (head capsule separated). *m*. Metathorax and abdomen (dorsal setae on left, ventral on right).

*Head*: 0.8–0.9 times as long as broad. Antennae 0.6–0.8 length of head, slightly curved, broadening just above base (greatest breadth is 0.14–0.18 length of antenna), then tapering to terminal third which is parallel-sided; with sparse fine spicules; seta 1 arising at about mid-length, stout, plumose, single or bifurcate near tip, 0.3–0.5 length of antenna; terminal and subterminal setae arising close together, 2 moderately long, 3 short, 4 shorter than 2, 5 broad with pointed tip, 6 short. Head seta 1 single, slender, curved, simple; base of 7 slightly behind base of antenna, 6 level with base of antenna and about 0.6 distance from 7 to midline, 5 slightly posterior to 7 and lateral to 6, 4 mesial to and about midway between 5 and 6; 4 short, fine, 7–15-branched; 5 and 6 about 0.5–0.6 length of antenna, stout, plumose, single or rarely bifurcate beyond mid-length; 7 plumose, 6–10-branched; 8 long, single; 9 3–6-branched; 10 2–6-branched, rarely single; 11 5–10-branched, plumose; 12 single to trifid; 13 fine, 5–10-branched; 14 short, stout, single; 15 short, single. Setae of mouthbrushes apparently all simple in 15 specimens; some of the more mesial setae finely pectinate in seven specimens, including skin of holotype. (The occurrence of this type of dimorphism in some species was first brought to our attention by Mr. P. F. Mattingly.) Mentum triangular with median pointed tooth and 9–12 pointed lateral teeth, of fairly even length, but the more lateral ones stouter.

*Thorax*: Prothoracic setae 1, 2 and 3 without sclerotized bases, 1 the longest, single or rarely bifid, finely plumose; 2 single, simple, about 0.6 length of 1; 3 fine, 5–10-branched, about 0.2 length of 1; 14 short, single or bifid. The bases of the meso- and metathoracic pleural setae bear very large curved pointed spines.

*Abdomen*: Seta 6 on segments I–VI in length about 0.5 width of segment; on I and II 2–5-branched, stout, plumose, arising from a large sclerotized base; on III–VI bifid (rarely trifid on III), slender, finely frayed. Seta 7 on I slightly shorter and finer than 6, 2–3-branched, plumose, arising from same base as 6; on II about 0.5 length of 6, 2–8-branched, plumose, arising from a separate sclerotized base. Eighth segment: Lateral comb a single curved row of 13–20 broad, apically rounded, coarsely fringed scales (in one specimen one scale was posterior to the row; in one specimen, one comb tooth was a small spine); seta 1 2–4-branched, finely frayed; setae 2 and 4 single, simple; seta 3 5–9-branched, plumose, arising from a small sclerotized base; seta 5 2–4-branched, frayed. Siphon slightly tapering, with small acus; index 2.2–2.9; pecten extending over basal 0.4–0.5 of siphon, of 15–23 close-set dark spines with 2–4 fairly even-sized denticles near base; the spines gradually increase in size from the base of the siphon, the distal ones very long, with inconspicuous denticles; seta 1 arising at 0.6–0.7 length of siphon, 2–3-branched, finely frayed, about 0.3 length of siphon; seta 8 single to trifid. Anal segment: Saddle covering about dorsal 0.9 of segment, without apical spines; seta 1 single, simple, about 0.6 length of saddle; seta 2 11–20-branched, about equal in length to saddle; seta 3 single, about 2.5 times length of 2; seta 4 of 11 14–22-branched tufts arising from a grid and 1 smaller precratal tuft; anal papillae pointed, subequal, the lower 0.7 or more length of upper which are almost equal in length to saddle.

Described from four skins, correlated with the holotype, allotype and two paratype males, and 18 morphotype larvae.

*Pupa* (Fig. 1, *l*, *m*).—The nomenclature of the setae follows Belkin (1952, 1953). The setae are simple, unless stated; their lengths are indicated in the figure.

*Cephalothorax*: Trumpet evenly pigmented, 2.7–3.2 times as long as greatest width, with oblique opening; ratio of meatus to whole 1 : 1.5–1.7, apical notch shallow. Setae 1, 2 and 3 single; seta 4 single to trifid; seta 5 single; setae 6 and 7 2–3-branched; seta 8 2–5-branched; seta 9 single; seta 10 single or bifid; seta 11 single; seta 12 single to trifid.

*Abdomen*: *Segment I*. Seta 1 strongly developed, with about 10 primary branches each subdividing into 2–4 simple or sparsely plumose branches. Seta 2 single or bifid; seta 3 single, may be inconspicuously frayed; seta 4 single or bifid; seta 5 2–3-branched; seta 6 single to trifid; setae 7 and 10 single. *Segment II*. Seta 1 single to trifid, may be inconspicuously frayed; setae 2 and 3 single; seta 4 2–4-branched; seta 5 3–5-branched; seta 6 single or bifid; seta 7 single; seta 10 single or bifid. *Segment III*.



Seta 1 single to trifid; setae 2 and 3 single; seta 4 single or bifid; seta 5 3-4-branched; seta 6 single to tetrafid; seta 7 single; seta 8 2-3-branched; seta 10 single to trifid; setae 11 and 12 single. *Segment IV.* Seta 1 single to trifid; setae 2, 4 and 5 single; setae 3 and 6 single to tetrafid; seta 7 single; seta 8 single or bifid; seta 10 2-3-branched; seta 11 single; seta 12 single or bifid. *Segment V.* Setae 1 and 3 single or bifid; seta 2 single; seta 4 2-5-branched; seta 5 single; seta 6 single to penta-fid; seta 7 single; seta 8 single or bifid; seta 10 2-3-branched; setae 11 and 12 single. *Segment VI.* Setae 1, 2, 3 and 5 single; setae 4 and 6 single or bifid; seta 7 single; seta 8 2-4-branched; setae 10, 11 and 12 single. *Segment VII.* Setae 1, 3 and 5 single or bifid; setae 2 and 4 single; seta 6 4-5-branched; seta 7 stout, single; seta 8 single to trifid; setae 10, 11 and 12 single. *Segment VIII.* Seta 5 single; seta 7 stout, single, slightly frayed. *Paddles* broad with bluntly pointed apex; index 1.2-1.5; midrib moderately and buttress slightly developed; fine denticles along margin; seta 1 single.

Described from three pupal skins, one correlated with the allotype and two with paratype males.

*Types:* Holotype female, Kalumburu (Drysdale River Mission), 14° 25' S., 126° 37' E., Western Australia, 14.iii. 1954 (0830-7), E. P. Hodgkin. Allotype male (0830-9), one paratype female (0830-8), four paratype males (0830-5, -6, -10, -11), and 18 morphotype larvae, same data as holotype. The holotype has a correlated larval skin, and the allotype and two paratypes (0830-5, -10) have correlated larval and pupal skins.

Holotype, allotype, one paratype male and six morphotype larvae in University of Queensland collection; paratype male (with correlated skins) and female and six morphotype larvae in University of Western Australia collection; one paratype male and two morphotype larvae in C.S.I.R.O. Division of Entomology collection, Canberra; one paratype male (with correlated skins) and two morphotype larvae in British Museum (Natural History); two morphotype larvae in School of Public Health and Tropical Medicine, Sydney.

This species is named after Mr. E. J. Britten, of the Department of Public Health, Western Australia, whose collections have added considerably to knowledge of mosquitoes of that State.

*Biology:* The type series was bred from larvae collected from a rot hole in the fork of a baobab tree (*Adansonia gregorii*). Hodgkin and Britten (1955) noted that larvae of *A. purpureus* which were found in the same treehole were preying on the larvae of *A. britteni*. The mean annual rainfall at Kalumburu is 37 inches, almost all of it falling from November to April. Mr. O'Gower found adult females occurred not infrequently in collections at the Roper River Mission, where the mean annual rainfall of 28 inches has a similar seasonal distribution.

*Distribution:* WESTERN AUSTRALIA: Kalumburu (the type series). NORTHERN TERRITORY: Roper River Mission, 14° 8' S., 134° 8' E. (17, 21, 22, 23.iv.1957, A. K. O'Gower).

*Discussion:* Though it lacks the characteristic pattern of lines on the scutum, *A. britteni* belongs to Group D (aureostriatus-group) of the subgenus *Finlaya*, in which Knight and Marks (1952) recognized eight subgroups.

It shows relationships to *A. quasirubithorax* (Theobald) and *A. keefei* King and Hoogstraal (subgroup IV, quasirubithorax) and also to *A. candidoscutellum* Marks (subgroup V, candidoscutellum), species which occur in north-eastern Australia and New Guinea. Males of both subgroups IV and V differ from *A. britteni* in having long hairs on the distal segments of the palp instead of short bristles.

*A. britteni* resembles *A. candidoscutellum* (which sometimes lacks a scutal pattern) in having broad white scales on the scutellum and in small patches on the pleuron, but in *A. candidoscutellum* the paratergite is bare (usually *ppn* also). The male terminalia of *A. britteni* bear a fairly close resemblance to those of species in subgroup IV, but differ in the short stout appendage of the style and the long setae on the harpago; the resemblance is less close to *A. candidoscutellum* which, however, has long setae on the harpago. The larva of *A. britteni* resembles those of both subgroups in the shape of the head, the long antennae, the form and position of head setae 5 and 6. The shape of the antennae and the form of seta 14 in *A. britteni* are distinctive. The

lateral comb is similar in *A. brittteni*, *A. quasirubithorax* and *A. keefei*, but the two latter species have distinct fine spines on the distal margin of the saddle.

The foregoing differences indicate that *A. brittteni* does not belong to either subgroup IV or V; nor does it fall into any of the other six subgroups of Group D. Another species from eastern Australia, *A. wasselli* Marks, which belongs to Group D and is known from females only, could not be placed in a subgroup by Knight and Marks (1952). *A. wasselli* has a scutal pattern and subspiracular scale patch; otherwise the thoracic scaling quite closely resembles *A. brittteni* and the two species appear likely to be nearly related. The following definition (in the terms of Knight and Marks, 1952) of a new subgroup to include *A. brittteni* has therefore been widened to allow the tentative inclusion of *A. wasselli* also.

Group D (aureostriatus-group: Hulecoeteomyia). Subgroup IX, *brittteni*. *Definition*: Australasian. Male palpi with segments IV and V downturned, III-V with a few strong apical hairs; short hairs only along IV and V (male of *wasselli* unknown). Basistyle without a specialized scale tuft. Hind tarsi with basal pale bands on I-III, I and II with or without apical pale patches or bands; V all white or with basal dark band. No postspiracular scales. Paratergite scaled. Subspiracular scales present or absent. *Supplementary characters*: Claspette filament blade-like. Female tori with fine hairs medially. Scutal linear pattern distinct or wanting. No prealar scale patch. Larval head hair 5 posterior to 6, 7 and 4 on a line between 5 and 6. Comb consisting of a curving row of scales. Larval habitat: treeholes. (Larva of *wasselli* unknown.)

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